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Occurrence of Lessepsian migrant *Lagocephalus sceleratus* (Tetraodontidae) in the Adriatic Sea

by

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Résumé. – Nouvelle occurrence de l'espèce migratrice lessepsienne *Lagocephalus sceleratus* (Tetraodontidae) en mer Adriatique.

Le 8 avril 2014, un spécimen de *Lagocephalus sceleratus* (Gmelin, 1789) (mâle ; longueur totale, TL = 53 cm ; poids, W = 1536 g) a été capturé dans la baie de Vodice (mer Adriatique, eaux croates orientales). Il s'agit du troisième signalement de cette espèce dans les eaux croates de la mer Adriatique.

Key words. – Tetraodontidae - *Lagocephalus sceleratus* - Adriatic Sea - Lessepsian migrant - Record.

Lessepsian migration, a process of the colonization of the Mediterranean Sea by Indo-Pacific and Red Sea species via the Suez Canal, has considerably enriched biodiversity in the Mediterranean Sea. Concerning Lessepsian fish, 85 species have been recorded in the Mediterranean (Fricke *et al*., 2012), while 13 of them were recently reported from the Adriatic Sea and among them it seems that two species *Fistularia commersonii* Rüppell, 1838 and *Siganus luridus* (Rüppell, 1829) established self-sustaining populations in the Adriatic Sea (Dulčić *et al*., 2013).

Invasive Lessepsian migrant silver-cheeked toadfish *Lagocephalus sceleratus* (Gmelin, 1789) is listed among the 100 worst invasive alien species (IAS) in the Mediterranean Sea with profound social and ecological impacts due to the presence of tetrodotoxin, a potent toxin, which can be a source of food poisoning, and impact on fisheries and biodiversity (Katsanevakis *et al*., 2014). It was first recorded in the Mediterranean Sea near the south-eastern Aegean Sea coast of Turkey (Akyol *et al*., 2005) and since then showed a rapid expansion throughout the eastern Mediterranean Sea reaching the northernmost parts of the Aegean Sea and south-west to Tunis (Kalogirou, 2013). The silver-cheeked toadfish also reached Adriatic Sea (Sulić-Šprem *et al*., 2014; Dulčić *et al*., 2014).

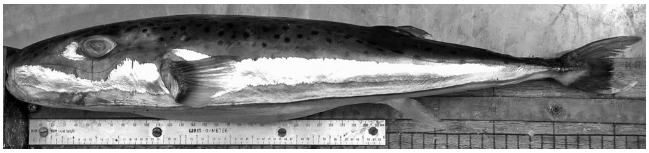

Figure 1. - The specimen of *Lagocephalus sceleratus* captured in Vodice Bay (middle eastern Adriatic, Croatian waters) on 8 Apr. 2014.

The aim of this note is to present an additional record of silver-cheeked toadfish with discussion on its recent status in the Adriatic Sea.

MATERIAL AND METHODS

On 8 April 2014, one specimen of *L. sceleratus* (male; total length, TL = 53 cm; weight, W = 1536 g) (Fig. 1) was captured in Vodice Bay (middle eastern Adriatic, Croatian waters) (Fig. 2). The specimen was preserved and deposited in the Ichthyological Collection of the Institute of oceanography and fisheries in Split, Croatia (catalogue number: IOR-Ls3-2014). This represents the third record of this species in the eastern Adriatic (Croatian waters).

All measurements were taken with a dial calliper to the nearest mm. Morphometric measurements and meristic counts were made following Sulić Šprem *et al*. (2014).

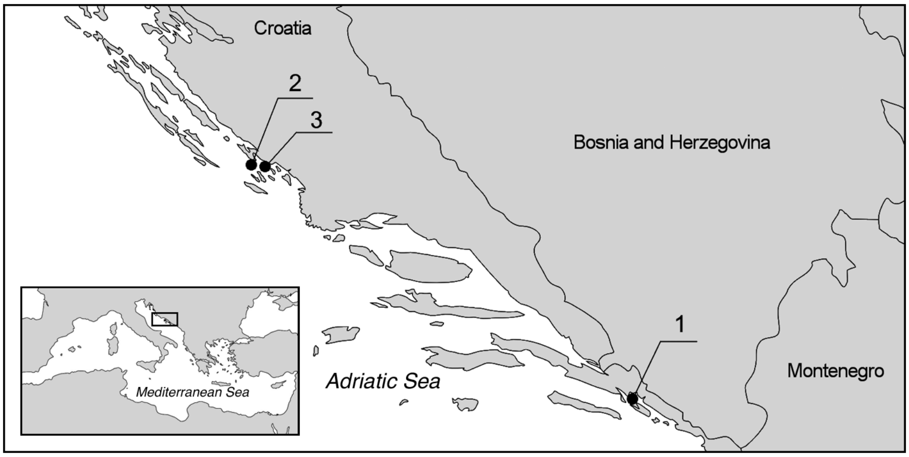

Figure 2. - Map of the Adriatic showing the locations of caught specimens of *Lagocephalus sceleratus* (1: first record; 2: second record; 3: third record, this study). Numbers of findings are chronological.

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Table I. - Morphometric measurements and counts of *Lagocephalus sceleratus*.

Measurements	(mm)
Total length	530
Fork length	452
Max. body depth	84
Min. body depth	16
Snout-pectoral fin	132
Head depth	68
Preorbital distance	67
Predorsal distance	290
Anus-anal fin	36
Orbit height	17
Orbit width	30
Counts	
Dorsal finrays	12
Anal finrays	10
Pectoral finrays	16

RESULTS

Morphometric and meristic characteristics of the specimen are presented in table I.

Description: Body elongate, boxy, somewhat compressed laterally and inflatable. No scales on the body, except for small spinules on the belly and on the dorsal surface extending to origin of dorsal fin. Dorsal and anal fins located posteriorly without spiny rays. Pelvic fins absent. Top of pectoral fin base below lower margin of eye. A raised skinfold along lower side of caudal peduncle. Single gill slit in front of pectoral fins. Body colour gray to brownish with regularly distributed black dots dorsally, and white ventrally. A distinct wide silver band on the lower part of the flanks and a silver blotch in front of eyes. Pectoral fin base black.

Counts and measurements and colour pattern agree with the description of *Lagocephalus sceleratus* given by Akyol *et al.* (2005).

DISCUSSION

First specimen of *L. sceleratus* in the Adriatic Sea was caught in October 2012 on the northern side of Jakljan Island (off Dubrovnik, Croatia, southern Adriatic) (Fig. 2). It was a sexually mature female (TL = 66.3 cm) weighing 3.5 kg (Sulić-Šprem *et al.*, 2014). Second specimen (TL = 49.2 cm, W = 1422 g) was found on 17 March 2013 near Tribunj (middle eastern Adriatic, Croatian coast) (Dulčić *et al.*, 2014). The specimen from this study was caught near the town of Vodice, which is near Tribunj (Fig. 2). Golani *et al.* (2011) emphasized the importance of reporting of subsequent records of alien fish species in order to acknowledge the establishment and distribution of those species in newly colonized areas. Subsequent records may indicate that previous occurrences were not just accidental and that the new region is included in the zoogeographic range of the species. It is a difficult but important question to assess whether a given exotic species has managed a self-maintaining population in new areas (Golani *et al.*, 2011). Same authors arbitrarily defined as 'established' those non-indigenous species (NIS) represented by at least three distinct published records, separated in time and space, and as 'alien' those NIS represented with only one or two reliable records. If we consider this criterion, then we have indication that *L. sceleratus* established its population in the eastern part of the Adriatic Sea, in Croatian waters. This does not sound unrealistic or without an argument especially if we take into account the statement of Kalogirou (2013) that this species possess significant ability to colonize new areas rapidly and establish populations. Spatial and temporal distribution of *L. sceleratus* in the eastern Mediterranean Sea is presented by Kalogirou (2013) showing a rapid expansion throughout the eastern Mediterranean Sea reaching the northernmost parts of the Aegean Sea and south-west to Tunis (reaching western Mediterranean) but has so far not been observed in Italy. Since then, however, this species has also been found in Italian waters (Azzurro *et al.*, 2014). *Lagocephalus sceleratus* has few properties that justify its classification as invasive species. It has been regarded as harmful to human health (Kalogirou, 2013), fishing gears (Katsanevakis *et al.*, 2014) and biodiversity (Bilecenoglu, 2010). It has been reported to have the ability to quickly spread and exploit resources, competing with the native carnivores (Kalogirou, 2013). Sandy bottoms were found to be very important habitat for the juveniles of this species, while the adults are more common in *Posidonia oceanica* meadows (Kalogirou *et al.*, 2012). Therefore, the rapid expansion of this species can affect diversity as well as the abundance of native species in the near future, especially with changing environmental conditions through climate change since this is expected to facilitate the progress of its adaptation to the new environment (Kalogirou, 2013).

There is no doubt that fish biodiversity in the Adriatic Sea is changing but to what extent established warm-water species will affect its ecological balance remains to be seen and continuous monitoring is essential. The potential effects following the establishing of *L. sceleratus* are, in this moment, hard to predict, and the fundamental knowledge on species life-history characteristics is important for better understanding of environmental responses and invasion biology. We hope that these new appearance may be taken into serious consideration to accelerate the realization of action plans and scientific projects related to identification and distribution of non-indigenous species (in agreement with European directive and its invites to establish environmental targets for the achievement of GES, especially for Descriptor 2) at national level.

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